

falling off of its power in this direction after twenty years of age.

With regard to the value of and necessity for revaccination, the experience of the committee confirms that of a similar committee which reported upon the small-pox epidemic of 1870-72. "No greater argument to prove the efficacy of this precaution," says this report, "can be adduced than the fact that out of upwards of 14,000 cases received into the hospitals only four well-authenticated ones were treated, in which revaccination had been properly performed, and these were slight attacks."

NOTES.

THE work of preparing Bushy House for the National Physical Laboratory is now approaching completion, and, His Royal Highness the Prince of Wales has fixed Wednesday, March 19, for the opening ceremony. The object of the Laboratory is to encourage the applications of physical science to manufactures and industry. This it will do by undertaking researches into questions of importance to either, and by testing apparatus and material used in trade.

PROF. J. W. GREGORY, F.R.S., has been temporarily appointed head of the Geological Survey of Victoria, with a view to its complete reorganisation and the substitution of a staff engaged on a permanent basis instead of the present temporary plan. The Victorian Government is paying for extra assistance in the geological department of the University while Prof. Gregory is engaged upon this work.

AN expedition to Lake Eyre, the great depression in Central Australia sinking below sea-level, has recently left Melbourne. The party consists of Prof. J. W. Gregory, his assistant, Mr. H. J. Grayson, and five students of the geological department of the Melbourne University. The main objects of the expedition are the study of the physical history of the Lake Eyre basin and the collection of fossils, especially the extinct giant vertebrates. The camel caravan starts from Hergott Springs, a station 440 miles north of Adelaide. It is hoped that the collections will throw light on some unexplained native traditions as to former giant animals that inhabited the Lake Eyre basin.

THE annual congress of the Sanitary Institute will be held in Manchester on September 9-13, when Earl Egerton of Tatton will preside. Section I. (Sanitary Science and Preventive Medicine) will be presided over by Sir J. Crichton Browne, F.R.S.; Section II. (Engineering and Architecture) by Sir Alexander Binnie; and Section III. (Physics, Chemistry and Biology) by Prof. A. Sheridan Delpéine. Eight technical conferences will also be held in connection with the congress.

IN the House of Commons on Monday, in reply to Mr. Field, who asked a question in regard to the proposed erection of a suitable College of Science in Dublin, Mr. Austen Chamberlain said:—"Thirteen thousand pounds was voted in 1899-1900 and applied towards the purchase of part of the site for a new college. I hope shortly to introduce a Bill for the acquisition of the rest of the site, for the provision of funds for the new building, and other purposes. I have satisfied myself by personal inspection of the existing college that that building is quite inadequate to the work which it is intended to perform."

THE American Society of Naturalists held a successful meeting at Chicago at the commencement of this month. There was a discussion on the relation of the Society to other scientific societies, an address by the president, Prof. Sedgwick,

on the modern subjection of science and education to propaganda, dealing largely with attempts to prevent the experimental study of physiology, a lecture by Dr. Howard on international work with beneficial insects, and 244 papers on scientific subjects. The society will meet next winter at Washington, in conjunction with the American Association for the Advancement of Science. A committee was appointed to confer with a similar committee to be appointed by the naturalists of the central and western States in regard to the relations of the two societies. At the meeting to be held next year the president will be Prof. J. McKeen Cattell, and the vice-presidents Messrs. C. D. Wolcott, L. O. Howard and D. P. Penhallow.

WE learn from *Science* that Mr. Andrew Carnegie's gift of ten million dollars for scientific research has been transferred to a corporation to be known as "The Carnegie Institution." The original incorporators include Dr. D. C. Gilman, lately president of Johns Hopkins University, the Hon. Chas. D. Walcott, Director of the U.S. Geological Survey, Dr. John S. Billings, and the Hon. Edward D. White. The objects of the Institution, in addition to the promotion of research, are set forth as follows:—To acquire, hold and convey real estate and other property necessary for the purpose of the Institution and to establish general and specific funds. To conduct, endow and assist investigation in any department of scientific literature or art, and to this end to cooperate with Governments, universities, colleges, technical schools, learned societies and individuals. To appoint committees of experts to direct special lines of research. To publish and distribute documents, to conduct lectures and to hold meetings. To acquire and maintain a library and, in general, to do and perform all things necessary to promote the objects of the Institution.

ON January 17 Lord Rayleigh opened this season's Friday evening meetings at the Royal Institution with a discourse on the interference of sound. In the course of his remarks he described some of his recent experiments with fog-horns, made for Trinity House. Fog-horns with elliptic cones instead of circular ones were tried, the major axis being about four times longer than the minor one. The experiments showed that the sound was best spread in a horizontal direction when the long axis was exactly vertical. It appears to be doubtful whether the phenomenon of the silent area is really due to interference between waves of sound reaching the spot direct and those reflected from the sea. If the effect were merely due to interference in this way, it ought to be possible to recover the sound by the listener changing his altitude above the sea surface, but Lord Rayleigh has on several occasions tried this on board the *Irene* and has not recovered the sound. When two or more fog-horns are used at one station, it sometimes happens that owing to the different sound waves being out of phase they more or less neutralise one another at certain distances, so that one source of sound is sometimes better than several. At the close of Lord Rayleigh's discourse, the Duke of Northumberland, as president of the Institution, unveiled a bust of Sir Frederick Bramwell, formerly honorary secretary of the Institution, and formally presented it to the members on behalf of the managers and their friends as a token of esteem.

THE death is announced of Prof. H. von Ziemssen, professor of pathology and therapeutics in the University of Munich.

COMMISSARY-GENERAL G. D. LARDNER, whose death at the age of eighty-four we regret to see announced, was the eldest son of the renowned Dr. Dionysius Lardner, and, like his father, he did much to encourage the study of astronomy, though his writings and lessons did not reach so large a public. He was a Fellow of the Royal Astronomical Society, and devoted his

leisure hours to scientific pursuits and to inspiring interest in natural knowledge in others. The death of such a man is a real loss to science.

ANNOUNCEMENT has already been made of the death, on December 24, 1901, of Mr. Clarence King, who for a short time was Director of the Geological Survey of the United States. His most important work was in connection with the geological exploration of the fortieth parallel, of which the main portion, published during the years 1876 and 1877, comprised various reports and the geological and topographical atlas of the Rocky Mountains, the Green River and Utah Basins, and the Nevada Plateau and Basin. At this date there were two other important geological surveys in the States apart from various local surveys; thus G. M. Wheeler was directing the surveys west of the 100th meridian, and F. V. Hayden was in charge of the Survey of the Territories. The three main surveys were consolidated in 1880 as the United States Geological Survey, under the directorship of Mr. King. Coming to the work from a long and successful experience, he elaborated a comprehensive plan of operations, and vigorously prosecuted the same through the assistance of a wisely selected corps of geologists and specialists. He directed investigations on Leadville in Colorado, on the Eureka district, and on the Comstock lode in Nevada. Mr. King, however, held office for a year only, retiring in 1881, as he believed he could render more important service to science as an independent investigator. He was succeeded by Major J. W. Powell, from whose introductory remarks in the second annual report of the United States Geological Survey we gather some of the above particulars. The hope entertained by Mr. King was not fulfilled, as unquestionably his most valuable contributions to science were his official maps and reports. In later years his most important paper was that on the age of the earth, which appeared in the annual report of the Smithsonian Institution for 1893.

SOME of the scientific results obtained by members of the National Antarctic Expedition during the voyage of the *Discovery* from the Cape to New Zealand are mentioned in an article in last Saturday's *Times*. It was part of the instructions of the expedition that the *Discovery* should proceed southwards towards the point of maximum total magnetic force. The despatches received state that on November 12, 1901, in latitude 50° S., longitude 131° E., Captain Scott determined to turn southwards towards this focus, running more or less on the line of no variation. The result was a very gradual increase of total force, while there were other points of interest in the observations of the dip and variation. The *Discovery* continued to push southwards till November 16, when the first ice was sighted. The detached pieces which were first met with were soon succeeded by a loose pack of drift ice, with occasional fragments of glaciers. On November 16 a sounding was taken in 2300 fathoms, while the magnetic observations showed a dip of 86° . The furthest south point reached was $62^{\circ} 50'$, in longitude $139^{\circ} 40'$ E. The highest glacier was seen on November 17, when another sounding was made in 2300 fathoms. The *Discovery* turned north-eastwards on November 17, and on the 18th a sounding was made in 1750 fathoms. Captain Scott then made as rapidly as possible for his destination in New Zealand. On November 22 Macquarie Island was reached. A landing was effected, and the naturalists did some good work. Auckland Island was sighted on November 25, and Lyttelton was reached on November 28. As already announced, the *Discovery* has since then turned her face southwards to enter upon the real work of the expedition. In order that the expedition may be in a position to complete the work for which it has been organised, it is essential that it should be free to remain away for at least two, and if possible three, years, as is the

case with the cooperating German expedition. For this end more funds are absolutely necessary (1) to supplement the equipment of the main expedition, and (2) to send out a second ship in the autumn of 1902. The second ship is indispensable if the expedition is not to return after one year's work. It is required to take out a further supply of coal and other stores, to bring away any members of the expedition who may be incapacitated, and to leave suitable substitutes, as well as to obtain information as to the further plans of the expedition. About 6000*l.* has been subscribed for this purpose, and at least 10,000*l.* more is required in order to equip and man the ship which has been obtained. The urgency of the need should inspire those who have the means to come forward with liberal offers of assistance.

A PAPER on modern machine methods, by Mr. H. F. L. Orcutt, read at the Institution of Mechanical Engineers on Friday last, contains a large amount of information in illustration of the value of perfected methods of machining. The use of accurate limit gauges instead of measuring with micrometers or calipers is strongly urged, even in small shops. There is a widely spread and erroneous idea, particularly amongst European manufacturers who would emulate American manufacturers, that the latest methods cannot be economically adopted except where work is thoroughly standardised, specialised, and made in large quantities. Mr. Orcutt thinks otherwise, and remarks that a single hole is more cheaply bored in a chucking machine than in a lathe. It is more easily made to a limit gauge than when the skill of a workman in setting his calipers has to be trusted. One spindle is more cheaply finished in the grinding machine than in the lathe, quality duly considered, and, again, is more easily finished to a limit gauge than to calipers, with the employment of less skilful labour. The idea that big quantities and standard work are necessary before modern equipment begins to play an important part in the economics of manufacturing, is described as the delusion of those who have grasped but a small part of the problem. The advantages of possessing a well-equipped laboratory and testing department are pointed out. Materials should be studied with a view to selecting that which is most suitable for the purpose, which, being most suitable, can be most rapidly machined, and which, fulfilling all conditions, is the cheapest. This cannot be accomplished with the haphazard methods commonly employed. Where the size of a shop does not warrant the expenditure necessary to support its own department, several manufacturers ought to combine and contribute to the support of a fully equipped laboratory. There is, however, Mr. Orcutt states, no practical reason why every mechanical engineering establishment in the United Kingdom should not have a testing institution at its command which could be constantly in use. The realisation of this state of affairs would be of incalculable benefit to the industries and commerce of Great Britain.

THE report of the proceedings of the fifth Congress on Criminal Anthropology has just been issued. Prof. G. A. van Hamel, the president, briefly described, in his opening speech, the scope of anthropology so far as it is concerned with criminology. Prof. Lombroso gave the Congress a comprehensive sketch of the progress of anthropological research since 1897, and read a paper on the prevention and treatment of crime. He was of opinion that the passions which inspire many serious crimes, especially those committed from political motives, were energies which might be turned to the advantage of the community if only they were classified and directed into the proper channels. Profs. Lacassagnes and Martin, adopting as their text *les sociétés ont les criminels qu'elles méritent*, contended that the only way to stamp out *recidivistes* and habitual criminals was to enact drastic laws to limit the consumption of alcohol,

and to provide against the dissemination of tuberculosis and venereal disease. Dr. Garnier, of Paris, stated that juvenile crime, which was rapidly increasing, was the result of the prevalence of alcoholism. Mr. Alexander Sutherland, of Melbourne, suggested that too much importance ought not to be attached to the theory of heredity, so far as it applied to crime, and pointed out that while in 1850 the population of Australia was composed of 135,000 individuals who were either convicts, or the children of convicts, and of only 105,000 normal persons, in 1880, after the course of but one generation, the number of criminals in Australia per 10,000 of the population was much below that in Prussia, Saxony, Italy and Sweden.

IN the *Scientific American* for January 4, Mr. L. P. Gratacap gives a popular and illustrated description of the discovery and preservation of the remains of the great dinosaur, brontosaurus, which have recently been placed in the Natural History Museum, New York. It was in 1898, under the direction of Prof. Osborn, that the colossal vertebrae, ribs and pelvic bone of the dinosaur were obtained from the Jurassic limestones of Wyoming. The total length of the animal has been estimated at more than sixty feet. The bones were taken out *en bloc* in the field, retained in the enveloping matrix, and shipped to New York, where a corps of skilled workmen finally extracted them from the stony matrix in the most perfect condition.

THE accompanying illustration of the Severn Bore is reproduced from a portion of the kinematograph picture recently obtained under Dr. Vaughan Cornish's direction with a bio-



scope camera and exhibited at the Royal Geographical Society. When first projected on the screen the Severn is seen at low water; in a few seconds the bore appears round the bend of the river about 500 yards distant, and it takes rather more than one minute to arrive at the position shown in the illustration. It is only upon reaching the shoal water near the camera that the wave curls over as here shown. The dark-fronted wave then rushes out of the field of view and the remainder of the film records the rapid current which follows close upon the bore. The film is 150 feet long with 2400 pictures, about half of which are views of the bore itself. The moving picture not only enables those who have never seen a tidal bore to realise the phenomenon with a completeness impossible from the examination of stationary photographs, but it provides a means for exhibiting at will a phenomenon which in nature is never precisely repeated. By repeating the projection of the picture as often as required, the various aspects of the phenomenon can be successively studied in a manner impossible to the observer of the bore itself. How much escapes observation when watching a transitory phenomenon, and the advantage of repeated projection on a screen,

NO. 1682, VOL. 65]

may be gathered from the various accounts which different spectators give of a kinematograph picture which all have seen simultaneously, but in which the points of attraction and interest are different in the case of different individuals.

SIR CHARLES TODD, K.C.M.G., F.R.S., has recently issued his comprehensive volume of meteorological observations in South Australia, for 1898. The work is divided into three parts; sections 1 and 2 deal with the observations at Adelaide and a number of other stations, and contain a valuable discussion on the exposure of thermometers in different screens. Section 3 gives the monthly and yearly totals of rainfall at 432 stations, and comparisons of the results with the averages for previous years. The annual distribution of rainfall is also clearly shown on a tinted map.

MR. J. E. CLARK has contributed an interesting paper to *Symon's Meteorological Magazine* for this month, entitled "Day Darkness in the City." He has recorded the number of quarter hours at which artificial light was necessary between 9h. a.m. and 5h. p.m. (Saturday afternoons and Sundays excepted) at the Wool Exchange, between October and March, 1897-1901. The tables show that November, December and January are preeminently the dark months, although, on the mean, November is a good deal behind the other two. The only really bad foggy months in the four years were December 1899 and January 1901, with which may be compared the prevalent fogs of November and December last. A diagram showing the distribution of dark quarter hours during the day shows a rapid rise between 9h. and 10h. and again about noon. The author points out that these anomalies are associated with the lighting of office fires and with preparations in the restaurants; in fact, smoke plays a main part in the darkness during both high and low fogs.

IN the *Bibliotheca mathematica* (iii. 2) for December 30, 1901, Prof. Gino Loria, of Genoa, gives an account of the late Prof. Beltrami, with a fairly detailed statement of the mathematical theorems and formulæ discovered by him. The paper is illustrated by a portrait of Beltrami.

SOME observations on the variation of position of the apparent horizon relative to the true horizon on the lake of Geneva are described by Prof. F. A. Forel, of Morges, in the *Comptes rendus de la Société helvétique* for the Neuchâtel meeting of 1899, recently received. The extreme relative displacements of the horizons, due to refraction, during eight months' observation varied from $-272''$ to $+501''$, the telescope being 2.5 metres above the lake. A table is given of corrections for refraction in terms of the difference of temperature at the surface of the lake and at the altitude of observation.

A SHORT paper on the observatory of the University of Durham is given by Prof. R. A. Sampson in the *Proceedings* of the Durham Philosophical Society. The observatory was built in 1840, and the chief event in its annals was the tenure of the post of observer by Richard Carrington, which, however, he resigned in 1852, after holding it for three years. From that time on the observatory seems to have had a chequered career until 1891, when the old equatorial was replaced by a new one. In 1896 a new departure was made; instead of the transit circle being renewed an almucantar was provided, and with this it is hoped to do rather better work than could be expected with a meridian instrument.

WE are glad to learn that the gliding experiments with which Lilienthal and Pilcher sought to investigate the balance and stability of machines supported by aeroplanes and aërocurves have not been discontinued since the death of these two investigators. A great deal of valuable work has already been done in America by Mr. Octave Chanute, and in conjunction with him

by Mr. Herring, both of whom have attained results in advance of those previously achieved, by the use of machines provided with movable wings. Still more recently, *i.e.* from October 1900 onwards, two other workers have attacked the problem, namely, Mr. Wilbur Wright and Mr. Orville Wright, of Dayton, Ohio. Mr. Wilbur Wright adopts a two-surfaced machine and assumes a horizontal position when gliding, with the view of diminishing head resistance. He has successfully worked with a surface area of double that used by previous experimenters, and has on several occasions extricated himself from the dangerous position in which Lilienthal and other observers have found themselves when suddenly brought to rest in a high wind.

PROF. V. MONTI has forwarded us three papers dealing with the question of prevention of hailstorms, which is now exciting so much interest in Italy. One of these, published by the Italian Meteorological Office, deals generally with the distribution of hailstorms in Italy at different seasons. Prof. Monti divides Italy roughly into three different regions, the "Padan" region, including the valley of the Po and certain Alpine stations, where hailstorms commence between the end of February and May and cease about November; the "Peninsular" region, where no month is altogether exempt from hail; and the "Calabro-Sicilian" region, which is characterised by an almost complete absence of hailstorms during the summer months. A second paper deals with the question of whether hailstorms are affected by the detonations accompanying volcanic eruptions. In it Prof. Monti discusses an account of a hailstorm on Stromboli, by M. Brun, of Geneva, and other writers, and he infers that (1) the fall of hail is not prevented by volcanic detonations; (2) hail may even be formed in storms of volcanic origin, contrary to Faye's theory. In the third paper Prof. Monti discusses the effect of thunder on the production of hail, and quotes letters on the subject. He finds that two-thirds of the heavy hailstorms that have been carefully studied are accompanied with loud thunder ("tuoni forti o fortissimi"), and that the frequency of the thunder, both before and during the hail, does not prevent the formation of large hailstones. In one storm at Campofreddo, near Genoa, where the hail was large and abundant, the thunder was so violent as to break windows. The theory according to which hail is dispersed by cannonades, as the result of the atmospheric waves produced, derives no support from the observed results in connection with either volcanic explosions or thunder.

THE latest issue of the *Zeitschrift für wissenschaftliche Zoologie* (vol. lxx. part iv.) contains four papers, as usual, of a highly technical nature. The first, by Dr. E. Botezat, treats of the terminations of nerves in the taste-corpuscles. In the second, Herr P. Morgenstern describes the development of the hydroid zoophyte *Cordylophora lacustris*. Certain reproductive organs of sharks form the subject of a long article by Herr O. Huber; while Dr. E. Ballowitz treats of the gastrulation of the ovum of the common grass-snake. All the articles are illustrated by plates.

In a pamphlet published at Frankfurt-am-Maine and bearing the title "Der Zoologische Garten des Museu Goeldi in Pará (Brasilien)," Dr. G. Hagmann, an assistant on the staff, gives an excellent and well-illustrated account of the rise and progress of the menagerie which has been formed under the direction of Dr. E. Goeldi, the able chief of the museum. It was in 1893 that Dr. Goeldi, then attached to the museum at Rio, was appointed to take charge of and reorganise the museum at Pará; but, owing to the military revolution which then disorganised the greater part of Brazil, it was not till late in the following year that he was able to assume the duties of his new post. It was not long before his attention was directed to the formation of a zoological garden to illustrate the local fauna, and by 1895

this was in full working order. In the present pamphlet we have a list of the vertebrates—all natives of Brazil—which have been exhibited in the garden between July, 1895, and July, 1901. These comprise sixty-five species or races of mammals, one hundred and twenty-seven of birds, thirty-five of reptiles and amphibians, and nine of fishes. Many of the species exhibited are very rare, and much new information has been acquired in regard to the habits of several. Judging from the photographs with which the pamphlet is illustrated, the appearance of the garden must be highly attractive, and the idea of devoting it entirely to the local fauna is most excellent.

NOTICING that the tang of the head of some Eskimo arrows are provided with a screw, Herr Krause asks whether the screw is an Eskimo invention (*Globus*, lxxix. 1901, p. 8), for it would be strange if a people still in their stone age had in a mechanical contrivance progressed beyond highly cultured, superfine Romans of the Empire. Dr. Karl von den Steinen (*Globus*, lxxix. p. 125) answers this question in the negative, and points to the considerable trade there has been between the natives and numerous European sailors during the last century, and any extensive collection of Eskimo objects will also demonstrate that borrowing has taken place. Mr. H. Newell Wardle replies to Dr. von den Steinen (*Globus*, lxxx. 1901, p. 226) and points out that the Eskimo sometimes made their harpoon heads of the tooth of the narwhal, and as this has a spiral twist there is no need to seek elsewhere for a screw; he therefore thinks it will probably always remain an open question. The relation of the sickle to the saw, on the one hand, and to the dagger on the other is the subject of a learned philological and ethnographical treatise by Herr Hugo Schuchardt in *Globus* (lxxx. pp. 181 and 204).

A SECOND edition of the second volume of Prof. J. R. Green's "Manual of Botany" has been published by Messrs. J. and A. Churchill. The volume is concerned with plant classification and physiology, and several additions have been made with the view of increasing its usefulness and rendering it more readable. Prof. Green provides students with a valuable course of training in systematic botany and plant physiology.

WE have received the following botanical reprints from the United States, the first three being from the *Botanical Gazette*:—"A Study of the Sporangia and Gametophytes of *Selaginella apus* and *S. rupestris*," by Florence M. Lyon, a very careful study, illustrated by five plates; "Development of the Pollen in the Asclepiadaceæ," by T. C. Frye, from which it would appear that the connection of the pollen-grains into pollinia in this order is not associated with any speciality in the mode of development of the sporangium; "Further Notes on the Physiology of Polymorphism in Green Algæ," by B. E. Livingston, relating chiefly to the effect on Algæ of cultivation in various nutrient solutions; "The Seed-coats of certain Species of the Genus *Brassica*," by A. J. Pieters and Vera K. Charles, being *Bulletin* No. 29 of the U.S. Department of Agriculture, Division of Botany; "The Progress made in Botany during the Nineteenth Century," by Wm. Trelease, from the *Transactions of the Academy of Sciences of St. Louis*.

THE fact that the atomic weights of some of the most important elements have not as yet been determined with a sufficient degree of precision is clearly illustrated by a new determination of the atomic weight of calcium by F. W. Hinrichsen, the results of which are published in the last number of the *Zeitschrift für physikalische Chemie*. In spite of the importance of this element and numerous investigations carried out to determine its atomic weight, the latter cannot be said to be known with certainty. The value generally accepted as being most trustworthy is the result of a determination by Erdmann and Marchand in 1850, in which they obtained $\text{Ca} = 40.00$.

This is the number given on the tables of atomic weight issued by the German Chemical Society. Hinrichsen's method consists in the conversion of extremely pure Iceland spar into oxide of calcium. The only measurable impurity present in the spar was iron, the amount of which expressed as ferric oxide was '032 per cent. The conversion into oxide was effected in specially constructed platinum crucibles, the latter being heated in an electric oven at a temperature of 1200–1400° C. Four determinations of the atomic weight gave respectively 40'144, 40'141, 40'142 and 40'141—mean = 40'142. This number deviates considerably from that which up to the present time has been generally accepted.

In a paper on the fossil shells of the Colorado desert, published in a recent issue (No. 1256) of the *Proceedings* of the U.S. Museum, Dr. R. E. C. Stearns gives an interesting account of the formation of the desert itself. Surrounded by mountains except in the south, where it opens out, the Colorado desert of California was evidently once an extension of the Californian Gulf, which must once have reached inland some two hundred miles further than at present. The separation of the upper end of this old gulf, now forming the desert, has been caused by the sediment brought down on the east side by the Colorado river, which gradually silted up this portion of the gulf till the present desert area was isolated. Throughout the desert are to be found thousands of small fresh-water sub-fossil shells, mostly referable to the genera *Paludestrina* and *Physa*, which appear to have been transported partly by whirlwinds, but chiefly by birds. Some of the species of these molluscs are still living in certain localities in the desert. The remarkable variation exhibited by the shells of certain species is described in detail.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*) from West Africa, presented by Mr. F. S. Davidson; a Verreaux's Guinea-fowl (*Guttera edouardi*), a West African Python (*Python sebae*, var. *natalensis*) from Natal, presented by Mr. W. Champion; a Hudson Bay Squirrel (*Sciurus hudsonius*) from the Rocky Mountains, presented by Mr. Edward Whympers; a Lesser Sulphur-crested Cockatoo (*Cacatua sulphurea*) from Moluccas, deposited.

OUR ASTRONOMICAL COLUMN.

DIMENSIONS OF THE PLANETS AND SATELLITES.—In the *Astronomische Nachrichten* (Bd. 157, No. 3760), Prof. E. E. Barnard presents a series of revised reductions of measures made at the Lick Observatory in 1894 and 1895, together with recent determinations with the 40-inch refractor at the Yerkes Observatory.

Mercury.—The measures of diameter were made in the daytime, when the disc of the planet was little brighter than the sky background. Powers of 230, 460 and 700 diameters were used, and a piece of amber-coloured glass was placed as a screen over the eye-piece. The resulting mean value of the diameter was 2965 miles. During the observations the disc of the planet was carefully examined for the linear canal system described by other workers, but no such markings were seen. Under excellent conditions (especially on August 31, 1900), however, decided details in the form of three or four large darkish spots were readily distinguished, and were comparable to the markings on the moon as seen with the unaided eye.

Venus.—Measures were made of this planet specially to determine the extent of variation due to irradiation; night and day measures were both made with the full aperture of 40 inches, but the amber screen was used for the day series. The value obtained for the irradiation was 0'25. The day diameter of the planet is given as 7713 miles. A series of dusky markings were the only features observed on the disc, similar to but fainter than those on Mercury.

Minor Planets.—Measures of the albedos and diameters of

the four chief asteroids were obtained, with the following results:—

	Albedo.		Diameter.
	Mars = 1.		
Ceres ...	0'67	...	477 miles.
Pallas ...	0'88	...	304 "
Juno ...	1'67	...	120 "
Vesta ...	2'77	...	239 "

As seen in the 36-inch and 40-inch telescopes the discs of such asteroids as are measurable always appear well defined and round, with no traces of markings on their surfaces. The corrected values for the other planets are as under:—

		Diameter.
Mars (Equatorial) ...	...	4352 miles.
" (Polar) ...	...	4312 "
Jupiter (Equatorial) ...	...	90,190 "
" (Polar) ...	...	84,570 "
" Satellite I. ...	...	2452 "
" " II. ...	...	2045 "
" " III. ...	...	3558 "
" " IV. ...	...	3345 "
Saturn (Equatorial) ...	...	76,470 "
" (Polar) ...	...	69,780 "
" Satellite Titan... ..	...	2720 "
Uranus (Equatorial) ...	...	35,820 "
" (Polar) ...	...	33,921 "
Neptune ...	...	32,900 "

No markings were observed on Neptune, and its disc always appeared round.

HARVARD COLLEGE OBSERVATORY REPORT, 1901.—In his report for the year ending September 30, 1901, Prof. E. C. Pickering first mentions that of the three important astronomical events of the year, the Harvard College Observatory staff only participated in the determination of the light variation of Eros and the complete investigation of the changes of Nova Persei. The reason why no measures of Eros for parallax were made was that some fifty other institutions were cooperating in the work, rendering observations at Harvard unnecessary; in the case of the total eclipse in Sumatra the conditions were not considered sufficiently favourable to justify any large expenditure.

East Equatorial.—This instrument has been employed, as in former years, for photometric light comparisons with the achromatic prism polarising photometer; more than 16,000 settings have been made, including 1224 measures of the magnitude of Nova Persei. For double stars, &c., too close for examination with the above instrument, a second photometer has been adapted, and 2278 settings made with it. Other work with this equatorial has been the photometric measurement of Jupiter's satellites while undergoing eclipse, the light variations of the minor planet Eros and the asteroids Vesta and Tercidina, comparisons of long-period variables, and the selection and measurement of twelfth-magnitude standards.

West Equatorial.—This has been employed for similar photometric work on variables and comparison stars.

Meridian Circle.—Work with this instrument has chiefly consisted of zone observations to compare results obtained by use of crossed spider threads or ruled glass plates. The conclusions have been published in *Annals*, vol. xli. No. 7.

12-inch Meridian Photometer.—With this instrument 54,448 settings have been made by the director on 126 nights. A catalogue of 9233 Durchmusterung stars has been completed, and the planet Eros observed on 56 nights.

Meridian Photometer.—33,316 settings have been made on 98 nights, the principal work being the observation of a catalogue of 376 standard stars of the fifth magnitude; also comparison stars for Eros and other similar objects.

Henry Draper Memorial.—With the 11-inch Draper telescope 673 photographs have been obtained, and with the 8-inch instrument 1766 photographs. The total number of photographs taken during the year was 4081. Two new variables, three stars with peculiar spectra, and the presence of bright hydrogen lines in the spectrum of U Andromedæ, have been detected. Photographs of the spectrum of lightning were obtained with the Draper telescope with objective prism during the summer.

Respecting the production of stellar spectra two new devices are announced. For photographing the spectra of stars near the horizon, below 10° altitude, the plan has been adopted of turning the objective prism by a computed amount so as to correct for the atmospheric refraction in declination. The stellar